The Effects of Knee Taping Techniques on Lower Extremity Kinematics During Running

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Introduction

Running is a popular form of physical activity, however, it is also linked to various lower extremity injuries. A commonly used technique for injury prevention and rehabilitation is taping. The clinical reasoning behind taping is to minimize pain, improve proprioception, increase muscle strength, improve gait and enhance functional outcomes by providing additional support. Two popular types of tape include Leukotape, a highly adhesive rigid tape, and Kinesio Tape, an elastic tape that can be stretched up to 120-140% of its length. There is currently limited to no research examining the effects of gender, speed, and type of tape on 2D lower extremity kinematics.

Purpose

To investigate the effects of gender, speed, and tape on 2D lower extremity kinematics and stride characteristics during running.

Method

Participants

Eight healthy runners were recruited for this study, 4 males (mean age: 23 ± 2.45 years; height: 174.63 ± 5.24 cm; weight: 77.25 ± 8.14 kg) and 4 females (mean age: 23.25 ± 1.71 years; height: 170.82 ± 8.64 cm; weight: 58.50 ± 4.51 kg).

Procedures

Taping interventions (Leukotape, Kinesio Tape, no tape) and speeds (2.35 m/s, 3.35 m/s) were determined via a randomization process.

Marker Placement

• Greater trochanter
• Lateral epicondyle
• Lateral malleolus
• Calcaneus
• Fifth metatarsal

Protocol

Lower extremity kinematics and stride characteristics were obtained using the Peak Motus System at initial contact, midstance, and toe off of running. Lower extremity stride kinematics were then compared using descriptive statistics.

Results

Gender and speed differences were found in both lower extremity kinematics and stride characteristics. Females exhibited greater hip and knee flexion, while males showed greater ankle dorsiflexion and plantarflexion. Additionally, females spent more time in contact with the ground whereas males spent more time in the air. The faster speed was associated with greater hip flexion and extension, peak knee flexion, and less time in contact with the ground. The different taping techniques did not result in any changes to the stride kinematics.

Discussion

While gender and speed appeared to have an effect on lower extremity kinematics, tape did not. This finding was not anticipated, however, it may be explained by issues that arose during data collection and the method of tape application. Although Leukotape is said to be a highly adhesive rigid tape, it had trouble remaining adhered to the skin throughout the protocol. This is likely the result of some participants having large amounts of hair on their legs as well as excessive sweating. As a result, the taping intervention may not have worked in the way in which it was designed, ultimately imitating the no tape condition. Furthermore, the amount of stretch applied to the Kinesio Tape during the application process may not have been large enough to illicit a change in the lower extremity.

Conclusion

This study reveals that different taping techniques do not seem to alter 2D lower extremity kinematics or stride characteristics in healthy runners. Future research with a larger sample size, pathological population, and 3D analysis is warranted. As a result, this will be investigated further in my master’s thesis research.